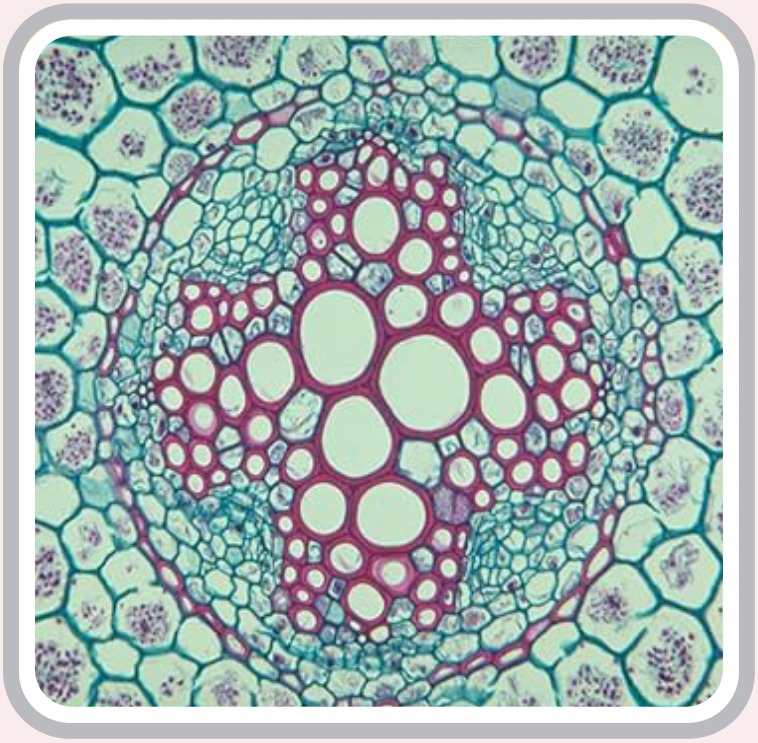
STEM Sims™

Relationships



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Relationships

Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.

Biodiversity refers to all life in an area. Take the following brief quiz to see how much you already know about biodiversity. See the bottom of page 4 to check your answers.

1. About how many different plants species have been identified on Earth?
   a. 380
   b. 38,000
   c. 380,000
   d. 3,800,000

2. About how many different animal species have been identified on Earth?
   a. 120
   b. 12,000
   c. 120,000
   d. 1,200,000

3. About how large an area does Earth's largest plant cover?
   a. 20 cm^2
   b. 200 m^2
   c. 200 km^2
   d. 2,000,000 km^2

4. The tallest plant on Earth currently reaches a height of a little over 116 meters. Which plant species holds the current record for *tallest* plant?
   a. redwood
   b. cypress
   c. cedar
   d. fir

5. What is the name of Earth's smallest flowering plant?
   a. Wolffia
   b. Thymus
   c. Lobelia
   d. Baby's breath

Are These Two Communities of Plants Similar?

The Sorenson's coefficient is a statistical tool used to determine the similarity in plant species of two different and separate communities of plants. The calculated coefficient results in values between 0 and 1. The closer the value to 1, the more similar the two communities of plants. The equation below provides a guide for calculating the coefficient.

Sorenson's Coefficient = 2C/(S1 +S2)

Where C = the number of species the two communities have in common, S1 is the total number of species found in community 1, and S2 is the total number of species found in community 2.

Materials Required

calculator

Procedure

1. Review the information in Scenarios 1 and 2 below.

Scenario 1

A plant survey is conducted and community 1 has a total of 20 species, while community 2 has 25 unique species. Communities 1 and 2 have a total of 5 plant species in common. Determine the Sorenson's coefficient for communities 1 and 2 and record this value in Table 1 below.

Scenario 2

A plant survey is conducted and community 3 has a total of 150 species, while community 4 has 250 unique species. Communities 3 and 4 have a total of 80 plant species in common. Determine the Sorenson's coefficient for communities 3 and 4 and record this value in Table 1 below.

Table 1. Sorenson's Coefficient Data

Communities	Sorenson's Coefficient
1 and 2	
3 and 4	

Question

1. Which of the two communities surveyed had plant species that were more similar?

2. Are either of these two plant communities very similar? Provide a reason to support your answer.

3. Which of the two communities surveyed had greater diversity of plant species?

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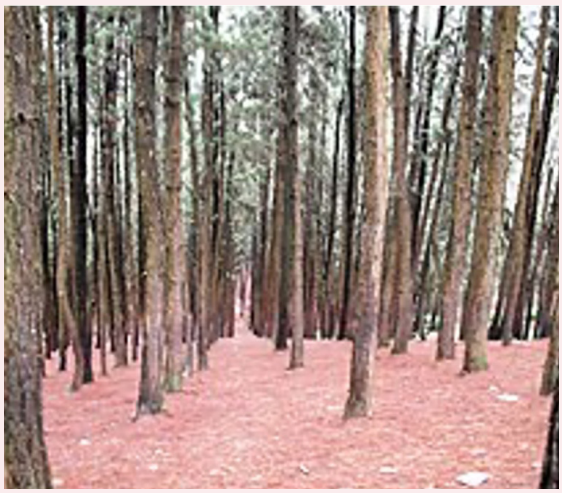
Toilet Paper For All

One of the most common uses for the recovered wood from pine forests is making paper, including toilet tissue. Due to the significant economic gains from paper production, large areas of natural forests and grasslands have been replaced by fast-growing pine trees. The process of replacing a diverse natural area with a single crop is called monoculture.

While the economic benefits of monoculture are easily seen, the negative impact on the other members of the native community are often less visible. Several studies have found that the diversity of mammals, birds, and insects was much greater in natural forests than in pine plantations. For mammals, the greater the distance between the native forests and pine plantation, the greater the diversity mammal species. This trend also held for the bird populations, even though birds have much freer access to move from one area to another area.



Pine monocultures can also impact living organisms in indirect ways. The replacement of natural forests with pine trees reduces the amounts of carbon and nitrogen in the soil more rapidly and to a greater extent than in natural forests. This leads to a lack of availability of growth components required by the plants typically found in the understory of forests. Additionally, soil pH levels are typically 0.2 units lower in pine than in other forests. As water filters through the soil with its increased acidity, the water can enter bodies of water through runoff and can lower the pH of the water. Increased acidity in the water can cause genetic damage to animals living in or depending on the water resource. Dramatic decreases in the population and diversity of insects worldwide have been attributed at least partially to the practice of monoculture.

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Answers: **Page 2 Answers:** 1) b, 2) d, 3) c, 4) a, 5) a. **Page 3 Answers**: Are These Two Communities of Plants Similar? Sorenson's coefficient between 1 and 2 = 0.222, between 3 and 4 = 0.40. 1) Communities 3 and 4 were more similar than 1 and 2 since the value of the coefficient was larger. 2) Since neither coefficient was close to 1, neither comparison of the two communities indicated very similar plant communities. 3) Communities 1 and 2 had greater plant diversity since they were less similar.

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